

2007

The IRS Research Bulletin

Publication 1500

The IRS Research Bulletin

Proceedings of the 2007 IRS Research Conference

Research
Analysis
Statistics

Taxpayer Services and Tax Compliance

James Alm, Georgia State University; Michael Jones, Bridgewater State College; and Michael McKee, Appalachian State University

An important trend in tax administration policies in recent years is the recognition that the traditional “enforcement” paradigm of tax administration, in which taxpayers are viewed and treated as potential criminals and the emphasis is exclusively on repression of illegal behavior through frequent audits and stiff penalties, is incomplete. A revised “service” paradigm recognizes the role of enforcement, but also emphasizes the role of the tax administration as a facilitator and a provider of services to taxpayer-citizens (Alm and Martinez-Vazquez, 2003). Indeed, many recent tax administration reforms around the world have also embraced this alternative paradigm with some success. However, while such “kinder, friendlier” provisions may improve the image of the tax authority, their actual effects on tax compliance have not, to our knowledge, been quantified. Our research utilizes laboratory experiments as a means of testing the range of possible information programs in terms of their effectiveness in enhancing tax compliance, and of comparing the compliance impacts of these “service” programs to the impacts of increased “enforcement” efforts.

In particular, subjects in our experiments earn income, report net income to a tax authority, and face an audit process. To investigate the existence of taxpayer services, we complicate the compliance decision of subjects, and then provide services that allow subjects to compute more easily their tax liabilities. By comparing the compliance responses of subjects to these service programs relative to more traditional enforcement methods (e.g., penalties and audits), we are able to determine the relative effectiveness of the alternative paradigms in generating greater taxpayer compliance. Our results are very preliminary, but they suggest that better services have less impact on compliance than increased enforcement. Future work will explore this important issue in much more detail.

Tax Compliance as a Behavioral Phenomenon

The simplest description of the tax compliance decision derives from the economics of crime approach pioneered by Becker (1968). The taxpayer is viewed here as facing a gamble between choosing the legal activity (e.g., full compliance) and the illegal activity (e.g., evasion). This is the framework

explored by Allingham and Sandmo (1972) and subsequently modified by many others. See Andreoni, Erard, and Feinstein (1998), Slemrod and Yitzhaki (2002), and Alm (2007) for recent surveys of the literature.

To illustrate, suppose that an individual receives a fixed amount of income I and must choose how much to declare to the tax authorities. Declared income D is taxed at the rate t . Unreported income is not taxed; however, the individual may be audited with probability p , at which point all unreported income is discovered and a fine f is imposed on each dollar of unpaid taxes. For the interesting case where $D < I$, the individual's income I_C if caught underreporting equals $I_C = I - tD - f(I - D)$, while, if underreporting is not detected, income I_N is $I_N = I - tD$. The individual chooses D to maximize the expected utility $EU(I)$ of the evasion gamble, or $EU(I) = pU(I_C) + (1-p)U(I_N)$, where utility $U(I)$ is assumed to be a function only of income. It is straightforward to show from this optimization that increases in the probability of an audit and/or the fine rate will increase compliance; that is, the standard model clearly demonstrates the role of an "enforcement" paradigm in generating greater tax compliance. Indeed, in this approach, the only reason for an individual to pay his or her taxes is the fear of detection (p) and punishment (f).

This approach has proven quite useful in the analysis of tax evasion. Even so, this approach is also a significant oversimplification of the broad activity we call "tax evasion." In the naturally occurring world, the setting and the resulting behavior are much more complex, which affects behavior in ways that go far beyond the scope of the basic model, and many relevant aspects of the compliance decision are necessarily omitted in this simple framework. Also, and of particular importance, observed high compliance rates in many countries are largely inconsistent with rational behavior assumed by the economics of crime model, given the enforcement efforts pursued by most governments. This observation suggests that the implicit assumptions underlying the application of the economics of crime approach to evasion require further investigation.

For example, it is implicitly assumed that the taxpayer is fully aware of the audit probabilities and the audit productivity when undertaking the evasion gamble. This is not necessarily the case, as the tax authority may not be able to announce audit probabilities and the taxpayers may not be able to learn the true probabilities either from their own experiences or from the experiences of others. Relatedly, the tax authority may not be willing to announce probabilities (or audit procedures), in the hopes that this obfuscation may increase compliance. Individuals may also have a tendency to overweight the probability of an audit, and such behavior could support high levels of compliance even with a low objective probability of an audit. Further, it is implicitly assumed in the standard approach that the definition

of evasion is one-dimensional, or simply unreported income (or the unpaid taxes that result directly from unreported income). In fact, the computation of an individual's true tax liability is multidimensional. There are many steps involved in the computation, and, in the presence of a tax code that is relentlessly complex, the computation of deductions, credits, taxable incomes, and the like is frequently open to interpretation. Other factors are also clearly relevant here.

The effects on tax compliance of at least some of these other factors have in fact been examined (Andreoni, Erard, and Feinstein, 1998; Slemrod and Yitzhaki, 2002; Alm, 2007). However, to our knowledge, there has been little systematic study of the effect on tax compliance of another important factor, one that relates directly to the "service" paradigm view of tax administration: a more accessible, service-oriented tax administration. Here, we specifically address the question of whether the tax authority can improve compliance behavior by adopting a more helpful interaction with the taxpayer. A related issue is whether this approach is more cost-effective than the traditional approach that emphasizes enforcement.

Given the nature of the tax code in many countries, individual tax reporting is a complex problem. Many of the provisions of the tax code are subject to interpretation. The effects of such increased complexity on tax compliance are not obvious and can work through several channels. See, among others, Alm (1988), Beck and Jung (1989), Scotchmer and Slemrod (1989), Alm, Jackson, and McKee (1992), and Krause (2000).

For example, taxpayers may respond to complexity by overpaying taxes, especially if they exhibit loss aversion. Suppose that complexity in effect assigns "fuzzy" values to the many elements in an individual's set of reporting decisions (e.g., deductions and tax credits). In the simplest setting, the result of fuzziness is a mean-preserving spread, and the degree of uncertainty is captured by the support of the distribution of the values. A risk-averse individual will likely respond to the uncertainty concerning allowable deductions and/or credits by erring on the side of caution and claiming smaller tax reductions than he or she may take.

Suppose, however, that this same individual is informed each period, after filing taxes, of the true tax liability and that this information repeatedly informs the individual that he or she overpaid. Suppose, further, that it is so costly to revise past tax returns that he or she does not do so. This person may ultimately feel that the fiscal exchange itself is less beneficial and respond by evading more. This is especially likely to arise if the individual feels that others are exploiting the uncertainty to reduce their compliance or believes that the penalties are lower when the required level of net income reporting is uncertain. Further, rulings by the tax administration may be seen

by the taxpayer as arbitrary and capricious, and the taxpayer may respond to such perceptions by reducing initial levels of compliance and waiting for an audit to provide the true interpretation. The negative effect on compliance may be exacerbated if the taxpayer responds to the complexity by intentionally evading through frustration, feeling that the tax authority deserves to be punished for the complexity through increased evasion.

In the face of such complex tax regulations, compliance may well be enhanced when individuals view their interactions with the tax authority in a more positive light. In particular, if the services provided by the tax authority are viewed as helpful and the responses to questions are provided in a timely and accurate fashion, then compliance is likely to be higher than if the interaction is viewed as being adversarial. This latter factor is not captured in the conventional economics of crime model of tax compliance. Again, however, it is possible to introduce other scenarios in which greater services may have the opposite effect on compliance. In general, then, an improvement in tax administration services has an ambiguous effect on compliance. The next section presents our experimental framework for examining the effects on compliance of improved service versus increased enforcement.

Experimental Design and Pilot Treatments

Our experimental structure replicates the fundamental elements of the voluntary reporting system of the U.S. individual income tax. Subjects earn income by performing a simple task, and they self-report this income to a tax authority. Only the individual knows his or her true level of income and can choose to report any amount from zero. An audit then occurs, and there is a positive and fixed probability that unreported taxes will be discovered. If the audit detects evasion, both the unpaid taxes and a penalty are collected from the individual.

To complicate this basic setting, and thus to introduce the potential value of tax service information, we introduce some institutional elements; these elements also increase the “parallelism” of our experimental design. First, an individual’s earned income is attributed to both “domestic” and “foreign” sources. Since the particular shares from these sources are not a matter of interest here, we set the share of foreign income at 40 percent of total income for all experiment sessions, a sufficiently high share that participants in the experiment will perceive the tax treatment of the foreign income as salient. In filing their tax forms, participants are allowed to claim a tax credit for foreign taxes paid (on the foreign income). Second, participants are allowed to claim a deduction from total income in determining taxable income. Both the exact level of the credit for foreign taxes paid and

the level of the allowed deduction may be uncertain to the taxpayer at the time of filing. This uncertainty is implemented via mean-preserving spreads (with a uniform distribution) on the tax credit and on the deduction. Subjects are always informed of the means of the allowed deduction and credit and the ranges for each, but, in some sessions, this uncertainty is resolved, as discussed below. Subjects are also informed of the tax, audit, and penalty rates, and subjects know these values with certainty. We fix the tax rate at 35 percent for all sessions. The audit probability and penalty rates comprise the collective enforcement effort. The audit rate is varied as a treatment; we fix the penalty rate at 150 percent for all sessions.

Since our objective is to compare the compliance effects of increasing traditional enforcement efforts versus a more service-oriented tax authority, our experimental treatments are changes in the provision by the tax authority of information that reduces the credit and deduction uncertainty versus changes in the level of enforcement effort. We cannot know the value individuals attach to the information, and, so, we cannot analytically construct an enforcement effort that would be viewed as equivalent to perfect tax ruling information provided by the tax authority. Accordingly, we adopt a strategy adopted by Alm, Cronshaw, and McKee (1993) to compare the effects of alternative endogenous enforcement regimes with simple increases in random audit probabilities. In this study, we compare the effects of increasing enforcement against the compliance levels when we provide perfect tax information at no cost. In subsequent work, we intend to broaden the information provision regime to allow for information cost and for the information to be less than completely accurate.

Our experimental setting is very contextual, and, together with the presence of an income earning task, we believe that it provides for the necessary degree of “parallelism” to the naturally occurring world that is crucial to the applicability of experimental results (Smith, 1982; Plott, 1987). The experimental setting need not—and should not—attempt to capture all of the variation in the naturally occurring environment, but it should sufficiently recreate the fundamental elements of the naturally occurring world for the results to be relevant in policy debates. In this regard, our experimental design uses tax language, requires that subjects earn income in each period, and requires that subjects disclose this income in the same manner as in the typical tax form. As in the naturally occurring setting, there is a time limit on the filing of income. A clock at the bottom of the screen reminds subjects of the time remaining, and there is a penalty for failing to file on time set equal in all sessions to 10 percent of taxes owed; also, the individual is automatically audited if he or she fails to file on time, so that the subject pays the noncompliance fine as well.

The experimental session proceeds in the following fashion. Each subject sits at a computer located in a cubicle and is not allowed to communicate with other subjects. The instructions are conveyed by a series of computer screens that subjects read at their own pace. Clarification questions are addressed after subjects have completed the instructions and three practice rounds. Subjects are informed that all decisions will be private; the experimenter is unable to observe the decisions, and does not move about the room once the session starts to emphasize the fact that the experimenter is not observing subjects' compliance decisions. These features reduce both peer and experimenter effects that could affect the decisions of subjects. All actions that subjects take are made on the computer.

In each round of the experiment, subjects earn income based on performance in a simple computerized task, in which they are required to move numbers in the correct order from one location on the computer screen to another location. The subject who finishes the task with the quickest time earns the highest income (1000 "lab dollars"); the second and third place finishers earn 800 lab dollars each, the fourth and fifth place finishers earn 600 lab dollars each, and so on. Ties in the earnings task are broken randomly. Subjects are informed of their earnings and those of the others in their group to ensure that they believe the relative nature of the earnings. These earnings represent the only information subjects have of other participants.

After earning income, subjects are presented with a computer screen that tells them their individual incomes in that round, as well as the tax policy parameters. These parameters include the audit, penalty, and tax rates. Importantly, subjects are told the amounts of their total incomes that are from foreign sources and the corresponding amounts from domestic sources. They are also told that they may claim both a deduction and a credit for foreign taxes paid. The deduction reduces the taxes that must be paid on reported income; the credit, which is set below the actual foreign taxes paid, also reduces the amount of the taxes that they pay. Subjects are informed that they may enter the amounts they choose for their earned incomes, their deductions, and their foreign tax credits. These choices determine the taxes that they pay on their reported incomes. They are also informed that they may be audited, in which case all underreported taxes will be discovered and a penalty equal to a multiple of unpaid taxes will be imposed.

Subjects choose the amount of money to report to the tax authority for each element of the tax form: income, deduction, and foreign tax credit. For each set of entries in the tax form, the computer automatically reports the resulting tax liability. Subjects are able to experiment with different reports during the time allowed for filing. Thus, they can observe the potential changes in reported take home income for each potential reporting strategy

they investigate. A timer at the bottom of the tax form counts down the remaining time. Subjects are allowed 100 seconds to file, and the counter begins to flash when there are 15 seconds remaining. Thus, the process in the lab mimics that by which a taxpayer may well conduct different calculations in the time prior to actually filing taxes, whether he or she uses one of the available tax software programs or simply does the tax return by hand.

Audits are determined by the use of a “virtual” bingo cage that appears on each subject’s computer screen. An image of a box with 10 balls (blue and white) appears on the screen following the tax filing. The balls begin to bounce around in the box, and, after a brief interval, a door opens at the top of the box. If a blue ball exits, then the subject is audited; a white ball signifies no audit. The fraction of blue balls determines the audit probability. The audit applies only to the current-period declarations, not to previous (or future) periods. The computer automatically deducts taxes paid and penalties (if any are owed) from subjects’ accounts. When an audit occurs, the true values of the uncertain components (deductions and foreign tax credit) are used, and the subject’s declarations are examined. If the subject has underreported tax liability, a fine is imposed. Tax revenues and any penalties are not distributed to subjects.

Subjects are informed that they will keep their aftertax earnings at the end of the experiment, converted from lab dollars to U.S. dollars at the rate of 800 lab dollars to 1 currency dollar, and paid in cash and in private. After income is reported and an audit (if any) is determined, subjects see one final screen that summarizes everything that happened during the round. This process is repeated for a fixed (but unannounced) number of rounds.

Table 1. Experimental Treatments

Enforcement Effort?	Information On?	
	No	Yes
Increase (“Base Case” to “High”)	T1	
Constant (“Base Case” to “Base Case”)		T2

Notes: Enforcement Effort Increase: “Base Case” $p=0.2$ to “High” $p=0.4$

Enforcement Effort Constant: “Base Case” $p=0.2$ to “Base Case” $p=0.2$

In all sessions, the fine rate is fixed at 150%.

The experimental design is reported in Table 1. The tax authority has two broad policy instruments: the level of enforcement effort and the level of service information that is provided to the taxpayer. As shown in Table 1, at this point, these instruments have been investigated only in limited and basic terms. Thus, the tax authority can adopt a “Base Case” (or constant)

or a “High” (or increased) level of enforcement. Since enforcement consists of both the probability of detection and the level of fines, the high level can be implemented as different combinations of higher audit probabilities or higher fines, and, at this, time we vary enforcement by varying only the audit rate, setting the audit probability at values 0.2 (Base Case) and 0.4 (High). Future work will expand the range of audit (and penalty) rates.

As for information, the tax authority can either provide the information regarding the interpretation of the rules or not (“Information On?”). In all settings, subjects face (initial) uncertainty regarding the allowed deduction and the allowed foreign tax credit, and are told at the beginning of each round the mean values and the spreads of the deduction and the credit. We hold the level of this uncertainty (via a mean-preserving spread) constant throughout all treatments. When information is made available (“Information On? Yes”), subjects are able to click on a button on the screen, and the true levels of deduction and foreign tax credit are revealed before they file their taxes. This mimics the ability to call a tax agency information help line and obtain accurate information at zero cost. (In subsequent research, we will impose a cost on obtaining this information.) If no information is provided (“Information On? No”), then subjects learn the true values of these uncertain variables only after they have filed their taxes. Overpayments are returned if the taxpayer is audited, as is the practice of the IRS in some cases, but not if the taxpayer is not audited. Thus, there is a cost of ignorance to the taxpayer that is greater if not audited, but the audit will also uncover over- and undercompliance.

The fixed parameters used for all sessions are reported in Table 2.

Table 2. Experimental Parameters

Parameter	Mean	High	Low	Increment/Deviation
Income	800	1000	600	100
Percent Foreign	40%	N/A	N/A	N/A
Tax Rate—Domestic	35%	N/A	N/A	N/A
Tax Rate—Foreign	35%	N/A	N/A	N/A
Deduction	20%			+/- 50 Lab\$
Foreign Tax Credit	50%			+/- 25 Lab\$
Fine Rate	150%	N/A	N/A	N/A

For our pilot study, we have employed a within-subjects design. The treatments are implemented as changes in the tax filing setting. Thus, subjects are in a Base Case setting for the first 10 rounds, and, in round 11, a treatment condition is turned on that is in place for the next 10 rounds, at which point the session ends. In future work, we will vary the order of the treatments.

The experimental laboratory consists of multiple networked computers, a server, and software designed for this series of experiments. Pilot sessions were conducted on the University of Calgary campus using student subjects recruited via announcements on campus. Potential subjects sign up for the sessions using a Web page and are invited to participate in a specific session by e-mail. Subjects are not permitted to participate in more than one of the sessions used for this paper, only subjects recruited specifically for a session are allowed to participate, and no subject has prior experience in this experimental setting. Methods adhere to all guidelines concerning the ethical treatment of human subjects. Sessions lasted just over 90 minutes, and earnings were in the range of \$19.25 to \$26.75.

Preliminary Results

We have conducted one pilot session for each of the treatments listed in Table 1. The overall compliance effects are reported in Table 3. We report all results as changes in the average level of compliance, calculated as an individual subject's reported income over his or her true income, averaged over all subjects. Also, since we utilize a within-subjects design and impose the policy change in round 11 of each session, it is useful to examine different behavioral responses using some simple graphs. There are several compliance measures that we can evaluate given the choices of reporting strategies that individuals can adopt in this setting. Individuals can evade (and increase take home income) in a variety of ways. They may simply underreport income; they may also cheat by failing to report the true amount of the tax deduction or of the tax credit. Accordingly, in Table 3, we report three measures of evasion: income underreporting, deduction overreporting, and tax liability underreporting.

Table 3. Aggregate Results by Experimental Treatment

Enforcement Effort?	Information On?	
	No	Yes
Increase	T1 Δ Deduction Compliance: 0.360 Δ Income Reporting: 0.083 Δ Tax Liability Reporting: 0.190 Number Increasing Tax Liability Reporting: 9 of 14 (64%)	
Constant		T2 Δ Deduction Compliance: -0.07 Δ Income Reporting: -0.027 Δ Tax Liability Reporting: -0.063 Number Increasing Tax Liability Reporting: 8 of 16 (50%)

These preliminary results indicate that increasing enforcement effort increases all three types of compliance. Perhaps surprisingly, providing uncertainty-reducing information has no significant impact on compliance.

These results are rather aggregate, and, in Figures 1 to 3, we report the round-by-round averages for the various compliance measures; for each case, the results are denoted by the name of the metric and the treatment. We see that for T2, there is little change in the aggregate behavior when the information is provided beginning in round 11. This is consistent with the result in Table 3 that half of the subjects in T2 increased compliance when the information was provided and half lowered or did not change their compliance. The most compelling result is shown in Figure 3 where the overall level of tax liability reporting is plotted for the 20 decision rounds. The increase in compliance in treatment T1 is most striking here, so that it is clear that the subjects respond to the higher level of enforcement effort. However, at this point, our results must be considered very preliminary. We have a very small sample, we have conducted only a single session in each treatment, and we have investigated a very limited set of experimental parameters.

Figure 1. Income-Reporting Behavior

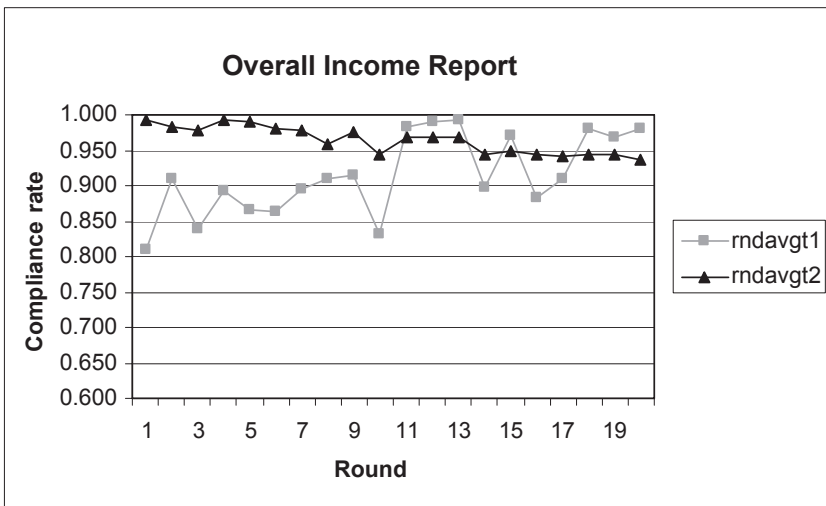


Figure 2. Deduction Compliance

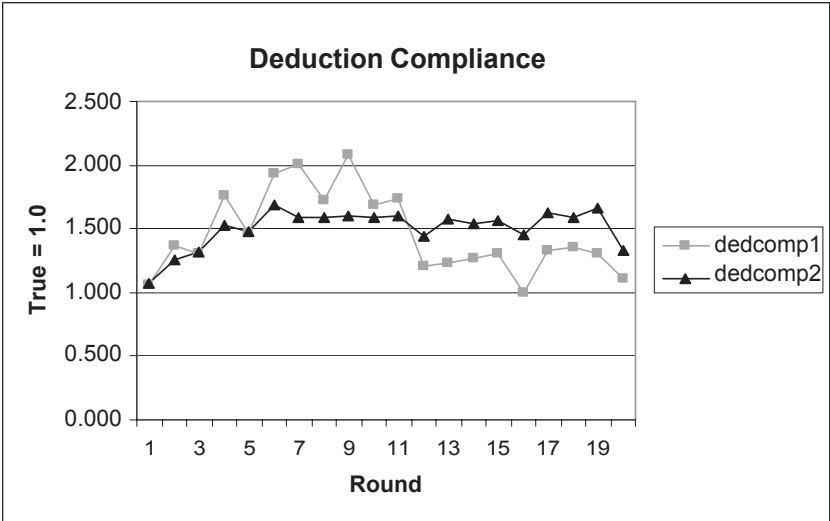
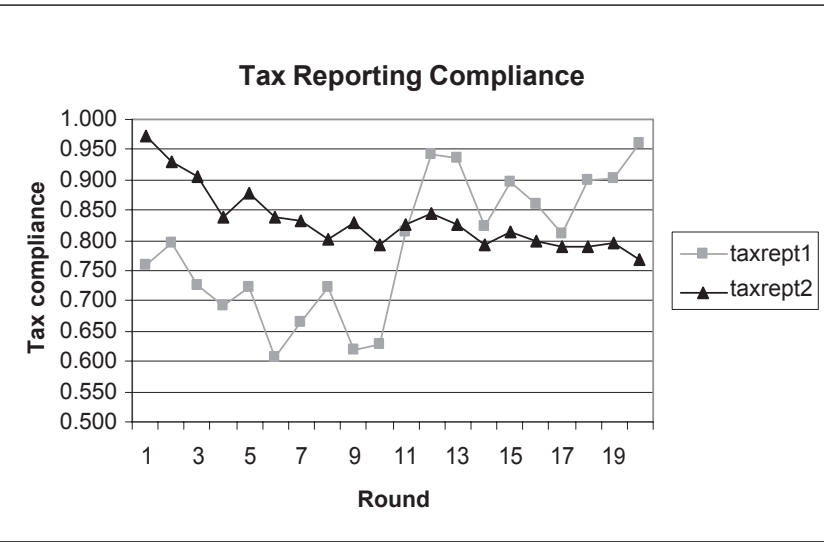


Figure 3. Tax Liability Reporting



Discussion and Conclusions

The deterrent effects of increased enforcement have been well documented. In contrast, the compliance effects of improved tax administrative services are largely unknown. It seems plausible that the tax agency can improve its public perception by providing taxpayer services such as prefilling information, and that the increased service level would translate into higher compliance. However, the actual effects on compliance of such improved service have not been investigated.

The service dimension that we examine here is the provision of uncertainty-reducing information prior to the taxpayer's filing decision. We find that this information provision has a negligible effect on reporting, and as many subjects increased compliance as did not after this information was provided. In contrast, a significant majority of subjects increased compliance when the audit rate was increased.

Information is an interesting item in the context of the effect of uncertain rules in tax-filing behavior. As Krause (2000) emphasizes, ambiguity in the tax code can be seen as an opportunity to evade or as a risk that can be reduced by overstating one's tax liability. Thus, information provided by the tax authority can have potentially offsetting effects. For those subjects in our experiment who were claiming the maximum deduction (the top end of the range), the new information may lead them to reduce this claim and to report their true allowed deductions. For those subjects who were hedging by reporting lower levels of deductions, the information will be used to increase their claimed deductions. Thus, the aggregate effect will depend on the number of taxpayers of each type. Investigation of this effect will have to wait until our sample sizes are larger.

Of course, information is only one mechanism by which the tax agency can increase its service provided to taxpayers. We are currently designing treatments to investigate the effects of these other mechanisms as well. Thus, even if the aggregate effect of information provision is found to be zero with larger sample sizes and broader parameter spaces, there are many other avenues by which the tax agency may be able to enhance compliance through the adoption of a service paradigm. For example, in the face of uncertainty regarding allowed deductions and credits, the tax agency may wish to apply differential penalties. Thus, underreported income may be punished more harshly than a claimed deduction that the individual is not permitted to claim. In this way, the tax agency may be seen as accommodating "honest mistakes" while punishing deliberate evasion.

Acknowledgments

This research was funded by support from the Internal Revenue Service. We are grateful to Kim Bloomquist and to participants of the 2007 IRS Research Conference for comments and discussions.

References

- Allingham, Michael G. and Agnar Sandmo (1972), "Income Tax Evasion: A Theoretical Analysis," *Journal of Public Economics* 1 (4), pp. 323-338.
- Alm, James (1988), "Uncertain Tax Policies, Individual Behavior, and Welfare," *The American Economic Review* 78 (1) pp. 237-245.
- Alm, James (2007), "Administrative Options to Close the Tax Gap," *Tax Notes*, forthcoming.
- Alm James; Mark Cronshaw; and Michael McKee (1993), "Tax Compliance with Endogenous Audit Selection Rules," *Kyklos* 46 (1) pp. 27-46.
- Alm, James; Betty R. Jackson; and Michael McKee (1992), "Institutional Uncertainty and Taxpayer Compliance," *The American Economic Review* 82 (4) pp. 1018-1026.
- Alm, James and Jorge Martinez-Vazquez (2003), "Institutions, Paradigms, and Tax Evasion in Developing and Transition Countries," in *Public Finance in Developing and Transition Countries*, edited by James Alm and Jorge Martinez-Vazquez, Edward Elgar Publishing, Cheltenham, UK and Northampton, MA, pp. 147-178.
- Andreoni, James, Brian Erard, and Jonathan Feinstein (1998), "Tax Compliance," *Journal of Economic Literature* 36 (2) pp. 818-860.
- Beck, Paul J. and Woon-Oh Jung (1989), "An Economic Model of Taxpayer Compliance Under Uncertainty," *Journal of Accounting and Public Policy* 8 (1) pp. 1-27.
- Becker, Gary S. (1968), "Crime and Punishment—An Economic Approach," *The Journal of Political Economy* 76 (2) pp. 169-217.
- Krause, Kate (2000), "Tax Complexity: Problem or Opportunity?" *Public Finance Review* 28 (4) pp. 395-414.

- Plott, Charles R. (1987), "Dimensions of Parallelism: Some Policy Applications of Experimental Methods," in Alvin E. Roth (editor), *Laboratory Experimentation in Economics: Six Points of View*, Cambridge University Press, New York, NY.
- Scotchmer, Suzanne and Joel Slemrod (1989), "Randomness in Tax Enforcement," *Journal of Public Economics* 38 (1) pp. 17-32.
- Slemrod, Joel and Shlomo Yitzhaki (2002), "Tax Avoidance, Evasion, and Administration," in *Handbook of Public Economics*, edited by Alan J. Auerbach and Martin Feldstein, Elsevier, Amsterdam, London, and New York, pp. 1423-1470
- Smith, Vernon (1982), "Microeconomic Systems as an Experimental Science," *The American Economic Review* 72 (5) pp. 923-955.